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The Relationship between Economic Growth and the Speed of Liberalization During Transition

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Abstract: "The Relationship between Economic Growth and the Speed of Liberalization During Transition"

The paper examines existing results on the effects of the speed of liberalization on growth performance during transition. We highlight methodological problems in these studies, noting the existence of simultaneous causation and the use of variables that are not valid measures of the phenomena they supposedly represent. We implement solutions, examining the simultaneous relationship between growth and speed of liberalization. Initial conditions are much more important than policy changes in determining growth performance in the first four years of transition. Growth performance during the early years of transition has a strong effect on liberalization speed.

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"The Relationship between Economic Growth and the Speed of Liberalization During Transition"
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Given the novelty of the transition from socialism and its importance for world economic development, it was inevitable that there would be flourishing debates concerning the advisability of different approaches to economic reform. Just as surely, there would come a time when economists would be able to use data derived from the experience of reform to assess the debates. The past few years have witnessed the publication of a burgeoning set of papers assessing the effectiveness of diverse reform programs.

An important sub-set of these papers focuses on the general character of reforms: if one were to characterize the tenor of reforms with a one-dimensional variable, what value of that variable would be an optimal choice? Obviously, addressing this question entails the adoption of a specific measure of the tenor of reforms. In the empirical literature, the speed of reforms has garnered the most attention. The influential *World Development Report* has cemented this focus on speed, by placing this variable at the center of its discussion of transition experience. The *Report* is representative of a number of studies in giving qualified support to the hypothesis that increased speed produces better results.

This paper is a methodological note on the interpretation of existing results on the effects of speed of liberalization on growth performance during transition. In addition to highlighting the methodological problems in existing studies, we have made tentative attempts to solve these problems and to ascertain the relationship between speed and growth. Our results suggest that single equation methods will give misleading results. The existing studies that have attributed importance to the speed of liberalization have probably over-estimated that importance.

Our results indicate that initial conditions are much more important than policy changes in determining growth performance in the first four years of transition. The pre-reform level of exports traded with other CMEA member countries and previous growth performance are highly significant determinants of growth during the first four years of reform. Initial conditions are also important as determinants of the speed of liberalization, especially the initial level of liberalization, higher levels of which seem to dampen subsequent reform efforts. But given the small sample and the likely errors in measurement, we believe that these results should be treated as having a substantial degree of error. The main effect should be to cast a warning light over the existing studies cited above.

We do not interpret these results as indicating that decisions regarding liberalization policy have no effects on growth. The insignificant effect of liberalization speed that we found probably reflects two opposing effects, the substantial gains from liberalization of entry of new firms and the costs of dislocation in the existing state sector. Over time, those costs will diminish in importance and the gains will still flow from new entry, meaning that liberalization of the economy will have a positive effect in the long run.

1. Introduction

Given the novelty of the transition from socialism and its importance for world economic development, it was inevitable that there would be flourishing debates concerning the advisability of different approaches to economic reform (e.g. Lipton and Sachs 1990 and Murrell 1992.) Just as surely, there would come a time when economists would be able to use data derived from the experience of reform to assess the debates. The past few years have witnessed the publication of a burgeoning set of papers assessing the effectiveness of diverse reform programs.

An important sub-set of these papers focuses on the general character of reforms: if one were to characterize the tenor of reforms with a one-dimensional variable, what value of that variable would be an optimal choice? Obviously, addressing this question entails the adoption of a specific measure of the tenor of reforms. In the empirical literature, the speed of reforms has garnered the most attention, despite many misgivings concerning the validity of this variable in capturing underlying theories. The influential *World Development Report* has cemented this focus on speed, by placing this variable at the center of its discussion of transition experience (World Bank, 1996, pp. 9-10). The *Report* is representative of a number of studies in giving qualified support to the hypothesis that increased speed produces better results.

The purpose of the present paper is to take stock of the evidence on the relationship between speed of reforms and economic growth during transition. We examine existing studies of that relationship, pointing out common methodological problems. We then present our own econometric results, which place a question mark on the conclusions of the previous studies.

Because this paper has the limited goal of assessing existing conclusions, we accept without question the pertinent literature's focus on the speed of reforms. We also follow existing studies in their focus on liberalization and we employ the data that existing studies use. Our purpose is not to quibble with these aspects of existing studies, but rather to question the conclusions of the studies using the general framework in which these conclusions were developed.

The analysis begins in Section 2 with a critical examination of existing studies. We suggest that there are four important methodological problems in these studies, problems that might cause estimates to be biased or coefficients to be misinterpreted. In Section 3, we examine how these problems might be solved and implement solutions, presenting estimates of the simultaneous relationship between growth and speed of liberalization. These estimates are sufficiently different from those in prior studies that we conclude that the methodological problems in these studies are significant. Our results suggest that reform experience is not accurately captured within single equation estimates of the relationship between growth and the speed of liberalization

2. A Review of Existing Empirical Studies

2.1 Measuring liberalization

Liberalization is at the heart of post-socialist reforms and it can be implemented very early in the transition process. Therefore, most existing studies have chosen to proxy speed of reforms by examining measures of liberalization. Use of these measures required a special data construction effort, which was undertaken by de Melo, Denizer and Gelb (1996; henceforth DDG) in connection with the writing of the *World Development Report*. In consultation with country specialists, DDG assembled data on the level of liberalization in three areas: in internal markets, external markets, and private sector entry. Their data set provides annual measures on these three components for 28 transition economies from 1989 to 1995.

The measure of internal-market liberalization reflects domestic price liberalization and progress in abolishing state trading monopolies. The external market measure assesses the liberalization of the foreign trade regime, including currency convertibility and the elimination of export controls and taxes and substitution of low to moderate import duties for import quotas and high import tariffs. Finally, the score on private sector entry reflects the openness of the economy to private sector development.¹

¹. The authors use privatization and banking reform as proxies for opportunities for private sector entry. DDG (1996, p. 6) acknowledge that these proxies "do not capture the overall quality of the legal and regulatory framework or the effectiveness of government in institution-building or in the implementation of reforms, but only because of the difficulty of developing

For the years 1989-95, DDG rated each country in each of the three areas on a scale from zero to one, with zero representing an unreformed Soviet-style economy and one representing a "basically-reformed" economy. To construct a composite annual liberalization index,² DDG calculated a weighted average of the three components, with the weights based on "notional estimates of the relative impact of [internal markets] and [external markets], which represent liberalization through introduction of competitive, flexible-price markets, and [private sector entry], which represents liberalization through changing ownership of fixed assets." (DDG 1996, p.6.) The weights given to internal and external markets were 0.3 each, while private sector entry received a weight of 0.4.

DDG also created a cumulative liberalization index (*CLI*), which in any year is the sum of all previous annual liberalization indices from 1989 on. The *CLI* is intended to measure the cumulative effects of the liberalization process, the rationale for its use being that "...at any given moment, economic performance will not be determined by the degree of liberalization in that moment alone; it will also be shaped by institutional and behavioral changes stimulated by prior policy reforms." (DDG 1996, p.7.) This logic justifies the use of the *CLI* as a determinant of growth. But the question that then arises is whether the *CLI* can be interpreted as a valid measure of the speed of reforms.³

The transparent answer to this question is no, despite the fact that a majority of the studies examined below interpret the *CLI* as a measure of the speed of reforms. To see this point vividly, suppose that we added the USA to our sample of countries. In 1989, the USA was already a "basically reformed economy," and presumably would have scored at the highest levels on the three measures of

comparative measures."

² There is a semantic issue that is worth mentioning, since this issue might be related to some of the problems of interpretation of results. Strictly speaking, in the classical sense, the word liberalization denotes the process of making an economy more liberal; it does not refer to how liberal policies are at any point. This word should be reserved to describe the rate of change in the degree of economic freedom. Therefore, the DDG data measure the level of economic freedom, not liberalization, the rate of change. Since this paper concerns itself with the results of other papers that use the word liberalization to refer to levels of economic freedom, we also use this word in this broader, but less felicitous, sense.

³ See World Bank (1996) Chapter 2 for such an interpretation of the *CLI*.

liberalization. Moreover, the USA remained at these high levels from 1989 to 1995. Therefore, the USA would have scored far higher on the *CLI* than would any of the transition countries. Does this mean that the *speed of reforms* in the USA has been greater than in any of the transition countries? Obviously not. Even tardy Tajikistan or unhurried Uzbekistan have seen far greater changes in their economic policies in the 1990's than has the USA.

The problems in using *CLI* to measure the speed of reforms are twofold. First, it ignores the distinction between policy and policy changes. The three disaggregate liberalization measures discussed above do not reflect changes in the policy stance, but rather the state of policy. Thus, a country such as Slovenia, which started reforms in the 1950's, had high levels on the three liberalization indices in 1989, and therefore on the *CLI*, even though post-socialist reforms in that country have not been particularly speedy.

Secondly, the *CLI* cumulates the liberalization measures over time, from 1989 onwards. This cumulation compounds the problem of using a measure of policy stance rather than one of policy changes. It also introduces a further problem in trying to discern the effects of speed. While communism fell in some countries in 1989, it lasted until 1991 in others. Since communist regimes limited the scope of economic reforms, one group of countries (those formerly in the USSR) would have a lower score on the *CLI* in 1995 simply because they were captives of communism until 1991. This makes the *CLI* a proxy for many other factors, such as being a former republic of the USSR or having had a less hard-line communist regime in the 1980's. Since these factors are plausibly related to growth performance, but none of these factors reflects speed of reforms, the effects of *CLI* will reflect much more than the influence of speed.

In the remaining elements of the paper, we will refer to the first problem as the one of ignoring the distinction between policy and policy changes and the second as the one of cumulation. In the remainder of this section, we review the results of existing papers on the relation between speed and growth, all of

which suffer from one or both of these problems. In section 3, we derive results that correct for these problems.

2.2 Previous empirical studies

DDG examine twenty-six transition countries, including those in Central and Eastern Europe (CEE) and the former Soviet Union (FSU).⁴ They regress average real GDP growth over 1989-94 (*AVGR*) on the *CLI* in 1994 (*CLI*), per capita income in 1989 (*PCY*), and a dummy variable for economies that have been affected by severe regional tensions during the reform period (*RT*), obtaining the following result:

$$\begin{array}{lcl} \text{AVGR} = & -9.1 & + 2.6\text{CLI} - 0.54\text{PCY} - 6.5\text{RT} \\ \text{(t-statistics)} & (-5.4) & (4.7) \quad (-1.9) \quad (-4.8) \end{array} \quad \begin{array}{l} \text{Adjusted } R^2=0.65 \\ \text{Number of observations} = 26 \end{array}$$

DDG (1996, p. 9) state that these results suggest that "cumulative liberalization has positive association with output changes in CEE/FSU, within the overall context of a 'transitional recession'." This study was the primary input into the *World Development Report*, which concluded that speedy liberalization usually allows countries to grow faster, blurring the distinctions between policies and policy changes and between cumulative and non-cumulative measures.

Apart from the two problems created by the use of the *CLI*, there are two further difficulties in the formulation of the regression model that is being tested. While policy changes affect growth, it is also true that growth might affect policy changes. Thus, a country that had a relatively small output decline in the early years of transition might well reform faster in later years if the good fortune is popularly attributed to the reforms. In a regression that summarizes the interaction between growth and policy over five years, it is surely possible that there can be two-way causation. The regression results reported above could suffer from simultaneous-equations bias.

⁴ The *de facto* politico-economic status of Mongolia before 1990 implies that this country can be included in the FSU for the purposes of analysis of transition experience. DDG include Vietnam and China in some of their analyses, but here we report only the results of analyses without these countries, for purposes of comparability with other studies.

Such a bias could be compounded by the omission of important independent variables, those reflecting the initial conditions of the countries. The most pertinent initial conditions will inevitably be related to the CLI. For example, the costs of adjustment will be higher, and hence growth lower, for those countries that had more trade conducted within the CMEA. But for obvious reasons those countries closer to Western Europe conducted a lower proportion of trade within the CMEA in 1989. The countries closer to Western Europe also entered the post-socialist era earlier. Hence, an important initial condition is correlated with the CLI.

Åslund, Boone, and Johnson (1996; henceforth ABJ) also use the *CLI* in their analysis of the relationship between liberalization and economic growth. Regressing percentage change in output from 1989 to 1995 (ΔOUT) on the cumulative liberalization index (*CLI*), a dummy for the ruble zone (*RUBLE*), and a dummy for a war-torn country (*WAR*), they obtain:

$$\Delta OUT = 0.84 + 0.0CLI - 0.32 RUBLE - 0.19WAR$$

(t-statistics) (6.46) (0.0) (-4.0) (-3.17) Adjusted R² = 0.74
Number of observations = 24

ABJ (1996, p.233) find that “there is no robust significant correlation between output change and any measure of reform.” Of course, this conclusion cannot be derived from the above regression in any simple way, because the regression does not contain a measure of reform. ABJ’s interpretation of the CLI as an indicator of reform is vitiated by the presence of the two problems in the use of this variable that we have identified above. This variable reflects much more than simply the amount of reform during 1989-95.

Moreover, there are two possible sources of bias in the estimate of the coefficient on *CLI*. First, as we have argued above, the cumulation intrinsic in the CLI might introduce a spurious correlation between growth and the CLI when countries start their post-socialist reforms at different times and when

the data for all countries in the regression covers the same calendar time. Second, there is the possible effect of simultaneity.⁵

A third formulation of the liberalization-growth relationship can be found in Sachs and Woo (1997). They regress average annual growth rates between 1989 and 1995 (*AVGGR*) on log of 1989 income (*LINC*) and an index of reform constructed by the EBRD (*RINDX*). The EBRD index covers more activities than those included in the CLI, assessing the progress of reform in nine areas including changes in the enterprise sector, markets, foreign trade, financial institutions, and law (EBRD, 1995, p.11). The index varies from a minimum of 10 in Turkmenistan to a maximum of 33 in the Czech Republic and Hungary. Sachs and Woo obtain the following results:⁶

$$\begin{array}{lcl} \text{AVGGR} = & -0.024 & -0.029\text{LINC} + 0.007\text{RINDX} & \text{Adjusted } R^2=0.35 \\ \text{(t-statistics)} & (-0.13) & (-1.07) & (3.43) & \text{Number of Observations} = 25 \end{array}$$

Since the EBRD index "assesses the status rather than the pace of change" (EBRD, 1995, p.11), there is no warrant for Sachs' and Woo's (1997, p. 8) conclusion that "faster reform was associated with higher, not lower, growth." No variable in the regression validly measures the speed of reform. This regression also has potential problems due to simultaneity bias and the omission of variables characterizing initial conditions, especially those which capture differences between CEE and the FSU and which are therefore likely to be correlated with *RINDX*.

Fischer, Sahay and Végh (1996a; henceforth FSV) estimate regressions for 25 countries of CEE and the FSU. They examine the period 1992-94, excluding prior years because "macroeconomic policy as commonly understood in market economies simply did not exist in more than half the countries before 1992." (FSV, 1996a, p. 60). But this procedure itself could bias results, since the early years of income

⁵. In comments on the ABJ article, Ickes (1996) makes similar points.

⁶. Sachs and Woo (1997) do not definitively state how many observations are in their regression and the number we give is based on our supposition. The calculation of the adjusted R-squared also depends upon this supposition. See also the earlier paper by Sachs (1996).

decline in the CEE are not used, and these are the years when CLI is smaller, by definition. Instead of using data aggregated across years, as in the other cited studies, FSV estimate several different fixed effects models on time-series cross-section data. They regress annual growth rates of real GDP (*AVGGR*) on the *CLI*, a dummy variable representing whether the exchange rate was fixed or flexible (*FIXED*), the fiscal balance of the government (*FISCAL*), and dummy variables for each country, obtaining the following result:⁷

$$\begin{array}{ccccccc} \text{AVGGR} = & 7.42\text{CLI} & + & 11.35\text{FIXED} & + & 0.3\text{FISCAL} & \text{Adjusted } R^2 = 0.55 \\ \text{(t-statistics)} & (3.54) & & (2.0) & & (1.42) & \text{Number of observations} = 75 \end{array}$$

The authors' conclusion is that the "state of market-oriented reforms, as reflected in the liberalization index *CLI*, appears to have been critical in spurring growth." (p. 61.) As with the other cited studies, this verbal interpretation of the results does not seem warranted given that the CLI reflects much more than the state of market-oriented reforms. By using country dummies, the FSV regression probably controls for initial conditions.⁸ But of course the problem of simultaneity is very much present as Fischer, Sahay and Végh (1996b, p. 231) acknowledge in a further paper, which reports similar results, suggesting that the "results should be viewed as a way of describing the data, rather than reflecting deep structural relations."

Krueger and Ciolko (1996) explicitly focus on the effect of including initial conditions in the growth-reform relationship. They examine 18 countries in CEE and the FSU, regressing an index of output in 1995 relative to output in 1989 (*ΔOUT*) on the *CLI*, a war-torn dummy (*WAR*), the initial share of total exports in national income (*EXP*), the level of GNP per capita in 1987 (*GNP87*), and the share of

⁷ The coefficients for country-specific effects are not reported, but (FSV, 1996a, p. 61.) write that "country-specific effects turned out to be highly significant (using a likelihood ratio test), indicating that there were some differences across countries that are not captured by the explanatory variables."

⁸ FSV (1996a, p. 62) write that: "The results also point to the importance of initial conditions -- trade dependence and initial per capita income -- in influencing the growth rate during the transition.." This claim is based on a regression that is reported in a footnote in their paper.

agriculture in total GNP (*AG*). The export share "is designed to capture 'distortions due to central planning,' while the latter two variables are added to capture relative backwardness and 'reformability'."

(Krueger and Ciolko 1996, p. 4) The results of a regression comparable to those in DDG are:

$$\Delta OUT = 51.97 + 4.01CLI - 10.80WAR + 91.49EXP - 24.61AG - 89.27GNP87 \quad \text{Adjusted } R^2 = .71$$

(t-statistics) (6.52) (1.18) (-1.37) (2.22) (.45) (-2.02) Number of Obs. = 18

Krueger and Ciolko (1996, p. 6) note that the "*CLI* loses its explanatory power...[when] plausible proxies for initial conditions are added... ."

2.3 Recap

Some of the aforementioned papers make a strong case that initial conditions must be included in the regressions. In addition, we have identified four basic problems in the interpretations of the regressions that we have examined:

1. The studies use the same calendar years for all countries in the sample implying that different phases of the post-communist economic cycle will be included in observations for different countries. When the sample of observations is formed in such a manner, the *CLI* must be correlated with the average yearly growth rate, since they will be both correlated with the number of years of post-communism experienced by the country. This will likely cause an upward bias in the estimate of the coefficient on *CLI*.
2. The regressions do not distinguish between policy and policy changes, therefore obscuring the effect of speed.
3. The cumulation intrinsic in the *CLI* further obscures the effect of speed, especially because the cumulation causes the *CLI* to be inversely correlated with such initial conditions as the importance of the CMEA in a country's trade relations.
4. Speed of reform could be an endogenous variable.

3. Estimating a Model Relating Speed and Growth

3.1 *The Equations*

In estimating our model, we react to each of the four problems identified above as well as adding appropriate initial conditions. First, we employ variables that are defined over the same number of years of post-communism for each country. Therefore, if there is a natural recession-followed-by-growth cycle after the fall of communism, we avoid any bias that might result from ignoring the effects of such a cycle. All 26 countries in Eastern Europe, the former Soviet Union, and Mongolia had experienced at least four years of post-communist reform by the end of 1995 (the last year for which the DDG liberalization measures are available). Therefore our growth variable reflects four years' experience for each country, beginning in the first year in which post-communist reforms were possible in each country.⁹

Second, we distinguish between policy and policy changes by using separate variables to measure speed and initial liberalization levels. By using an initial condition for beginning of levels of liberalization, we are able to distinguish the effects of post-communist reforms and reforms undertaken in the socialist era. This also allows us to avoid the third problem referred to above, the problem of interpretation caused by cumulation of the liberalization measure.

The endogenous nature of economic growth and liberalization speed is addressed by estimating a system of two equations: in one equation causality runs from speed to growth and in the other from growth to speed. Estimating the system using three-stage least squares facilitates a focus on two elements of endogeneity. First, there is the obvious channel, the possible two way causation between growth and speed. Second, there is the problem of simultaneity that might result from the omission of unmeasured variables that independently help to explain both speed and growth. When such variables

⁹. A table showing the years used is available from the authors on request.

are omitted, both growth and speed must be treated as endogenous variables for the purposes of estimation, even if causation between these variables flows in only one direction.

The first equation of the two in the model focuses on the determinants of growth:

$$GROWTH = \beta_0 + \beta_1 SPEED + \beta_2 L_0 + \beta_3 CMEA + \beta_4 PREGDP + \epsilon$$

GROWTH is average annual real GDP growth over the first four post-communist years. (Table 1 presents definitions of variables, the sources of data, and some basic statistics.) *SPEED* measures the speed of reform during those same four years. It is constructed using the three disaggregate liberalization indices developed by DDG and described above. The (aggregate) liberalization index in any year is calculated as the mean of the internal, external, and private sector indices. *SPEED* equals one fourth of the difference between the value of the liberalization index in the fourth year of post-communist reform and the value of the liberalization index in the last year of the old regime (L_0), capturing the extent of policy change. L_0 is also included in the equation, because the degree of liberalization at the beginning of post-communist reforms is expected to affect growth performance.

Initial conditions are captured in two variables. The studies reviewed above indicate that exports to CMEA member countries as a percentage of GDP at the beginning of reforms (*CMEA*) is an important determinant of growth during transition because of the effects on trade of the break up of the old institutional mechanisms.¹⁰ Given that there are few degrees of freedom, there is a need to capture a variety of initial conditions with a summary variable that indicates a country's growth potential. We do this with *PREGDP*, average real GDP growth in the last two years of the old regime. Lastly, ϵ is an error term.

¹⁰ For Bulgaria, the Czech Republic, Hungary, Poland, Romania and Slovakia, the data on *CMEA* are for 1989, the year prior to reform. For other countries, the data are for 1990, which is either the year prior to reform, or two years prior to reform.

In order to allow for the possibility of simultaneity, one must formulate an equation describing the determination of speed, which is a subject that has received much less attention in the literature than has the determination of growth. We use the following formulation:

$$SPEED = \gamma_0 + \gamma_1 GROWTH + \gamma_2 L_0 + \gamma_3 IND_0 + \gamma_4 POL_0 + \eta$$

GROWTH is included in the equation on the assumption that growth performance might affect willingness to reform, which is the primary source of possible endogeneity. L_0 captures the effects of the initial level of policy on further reforms. The initial share of industry in GDP (IND_0) reflects the influence of the level of development on reforms, especially those effects that result from a bloated industrial share, representing the deadweight of state enterprises. The measure of political freedom after the fall of communism (POL_0) is included because there might be popular demand for quick action, which can only be resisted by politicians who do not face re-election pressures. η is an error term, which could be correlated with ϵ .

3.2 The Estimates

Table 2 presents three-stage least-squares estimates of the model. The first set of results, Model 1, corresponds to the equations presented above. Although the results are self-explanatory, some prominent features deserve comment. The literature to this point has assumed that speed affects growth but that the reverse relationship does not hold. Our estimates indicate the converse. Growth performance during the early years of transition has a strong effect on liberalization speed. With such a small sample and with variables that are measured with some error, it would be inappropriate to set great store by this result. Rather, the most important implication is that single equation estimates of the effect of speed of reform on growth are likely to be misleading.

We also find that the error terms in the two equations are significantly correlated, with a negative sign. This result also leads one to doubt the accuracy of single equation estimates of the determinants of

growth in transition countries. The negative correlation indicates the omission of variables that affect speed and growth in opposite directions. It is not difficult to think of such variables. For example, a country experiencing difficult diplomatic relations with Russia might be persuaded to reform faster to cement ties with other parts of the world, while suffering a steeper decline in GDP due to the precipitate break in trade relations.

The coefficients on the initial conditions all have the expected signs. A high level of liberalization at the beginning of reform leads to higher growth during the first four years of reform, as does a higher pre-reform growth rate. Countries that had high levels of dependence on the CMEA grew more slowly. Hence, initial conditions do have a substantial effect on economic growth during transition, an effect that seems to be much more important than that of policy changes.

One issue that has arisen in the debates on reform policy is whether there might be a non-linear relationship between speed and growth. Some scholars argue that there is a critical mass of reforms that must be instituted in order to have an effect and others claim that there are diminishing returns to speed. Therefore we test two alternative models, using the logarithm of *SPEED* in Model 2 and the square of *SPEED* in Model 3. There is virtually no change in the results as a consequence of using either of these two non-linear variables, underscoring the conclusion from Model 1 that there is no direct effect of speed of liberalization on growth in the early years of post-communist reforms.

4. Conclusions

This paper is a methodological note on the interpretation of existing results on the effects of speed of liberalization on growth performance during transition. In addition to highlighting the methodological problems in existing studies, we have made tentative attempts to solve these problems and to ascertain the relationship between speed and growth. Our results suggest that single equation methods will give misleading results. The existing studies reviewed above that have attributed importance to the speed of liberalization have probably over-estimated that importance.

Our results indicate that initial conditions are much more important than policy changes in determining growth performance in the first four years of transition. The *CMEA* variable and the one measuring previous growth performance (*PREGDP*) are highly significant determinants of growth. Initial conditions are also important as determinants of the speed of liberalization, especially the initial level of liberalization, higher levels of which seem to dampen subsequent reform efforts. But given the small sample and the likely errors in measurement, we believe that these results should be treated as having a substantial degree of error. The main effect should be to cast a warning light over the existing studies cited above.

Finally, the reader might ask whether we view these results as indicating that decisions regarding liberalization policy have no effects on growth. We certainly do not draw this conclusion. The insignificant coefficient on *SPEED* probably reflects two opposing effects, the substantial gains from liberalization of entry of new firms and the costs of dislocation in the existing state sector. Over time, those costs will diminish in importance and the gains will still flow from new entry, meaning that liberalization of the economy will have a positive effect in the long run.

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Table 1: The Variables, Sources, and Basic Statistics

Variable	Definition	Source	Mean	Variance
<i>GROWTH</i>	Average annual real GDP growth over the first four years of reform.	World Bank (1995)*	-10.82	32.9
<i>SPEED</i>	Variable describing the speed of reform over the first four years of transition. Liberalization t years (L_t) after the beginning of transition is the mean of the three separate liberalization indices (internal, external, and private sector) developed by deMelo, Denizer and Gelb. Speed is $(L_t - L_0)/4$.	DeMelo, Denizer and Gelb (1996)	.13	.003
L_0	Level of liberalization in the last year of communism.	DeMelo, Denizer and Gelb (1996)	.18	.04
<i>PREGDP</i>	Average real GDP growth in the two years prior to reforms.	World Bank (1995)*	-4.01	24.81
<i>CMEA</i>	Share of exports as a percentage of GDP which were traded with CMEA member countries at the beginning of reform.	Fischer, Sahay and Vegh (1996a); United Nations (1992); World Bank (1995)*	.20	.01
IND_0	Industrial share of GDP in the year prior to reform.	World Bank (1995)*	.43	.01
POL_0	Level of political freedoms, as measured by the Freedom House Index, in the year prior to reform. Measured on a scale of 1-7, with 7 representing full political freedoms.	Freedom House (1995)*	4.96	2.68

* For the World Bank and Freedom House, data drawn from several years of these annual publications; the cited year refers to the reference list.

Table 2: Estimates of Models Relating Speed of Liberalization and Growth

Dependent Variable	Independent variable	Model 1	Model 2	Model 3
<i>GROWTH</i>	Constant	-7.59 (-1.09)	-3.62 (-0.60)	-7.75 (-1.27)
	<i>SPEED</i>	12.79 (0.36)	—	—
	Ln <i>SPEED</i>	—	0.95 (0.27)	—
	<i>SPEED</i> -squared	—	—	72.58 (0.45)
	L_0	10.38 (1.57)	9.96 (1.52)	10.94 (1.59)
	<i>PREGDP</i>	0.70*** (3.67)	0.72*** (4.17)	0.67*** (3.02)
	<i>CMEA</i>	-19.91*** (-2.69)	-20.61*** (-3.08)	-18.92** (-2.21)
Adjusted R-squared		0.63	0.64	0.61
<i>SPEED</i>	Constant	0.147*** (3.44)	0.146*** (3.43)	0.148*** (3.46)
	<i>GROWTH</i>	0.006*** (2.97)	0.006*** (2.97)	0.006*** (2.97)
	IND_0	0.13* (1.79)	0.13* (1.81)	0.13* (1.75)
	L_0	-0.20*** (-4.43)	-0.20*** (-4.42)	-0.20*** (-4.45)
	POL_0	0.008 (1.43)	0.008 (1.44)	0.008 (1.44)
Adjusted R-squared		0.48	0.48	0.48
Correlation of errors of the two equations		-0.64** (-2.23)	-0.61** (-2.18)	-0.68** (-2.26)

t-statistics in parentheses

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level;